Cyclic overriding of irregular stress in Armenian

Hossep Dolašian + Öner Özcėlik
hosép dolatján + ønér øztʃelik

Stony Brook + Indiana

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- Regular stress
- Cyclicity: schwa words
- Cophonology: overriding irregulars
- Alternative?
- Conclusion
What’s up?

- Title: *Cyclic overriding of irregular stress in Armenian*
- Regular stress:
  - Final, avoids schwas
    - So simple that you can model it in LOTS of ways
  ... strata, cyclicity, post-cyclicity, feet, no feet, etc...
What’s up?

- Title: *Cyclic overriding of irregular stress in Armenian*
- Regular stress:
  - Final, avoids schwas
  - So simple that you can model it in LOTS of ways
    ... strata, cyclicity, post-cyclicity, feet, no feet, etc...
- Irregular stress
  - Complicated
  - Licensing vs. blocking irregular stress will disambiguate theories
    = cyclic cophonologies (= complete descriptive coverage)
    ? try to reduce to morpheme-specific constraints
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● Introduction

● Regular stress

● Cyclicity: schwa words

● Cophonology: overriding irregulars

● Alternative?

● Conclusion
Armenian is an isolate in Indo-European
Typology: SOV, suffixing, and agglutinative
Two major dialects: Western and Eastern Armenian
Data: Focus on Western (native speaker)
Impressionistic + bits of previous literature
Regular stress

- Regular primary stress is on the final syllable
  - badas\textit{xán} ‘answer’
  - kahan\textit{á} ‘priest’

Final schwas resist stress

- Jer\textit{pén} ‘sometimes’
- V\textit{ákr} ‘tiger’

Main cue is F0 rise (Athanasopoulou et al., 2017)

‘Supposed’ to have initial secondary stress, but not really perceptible

→ Ignoring it
Regular stress

- Regular primary stress is on the final syllable
  - badas\textsuperscript{xán} ‘answer’
  - kahaná ‘priest’

- Final schwas resist stress
  - jerpémén ‘sometimes’
  - vákør ‘tiger’
Regular stress

- Regular primary stress is on the final syllable
  
  \text{badasxán} \quad \text{‘answer’}
  
  \text{kahanaá} \quad \text{‘priest’}

- Final schwas resist stress
  
  \text{jerpémen} \quad \text{‘sometimes’}
  
  \text{vákər} \quad \text{‘tiger’}

- Main cue is F0 rise (Athanasopoulou et al., 2017)

- ‘Supposed’ to have initial secondary stress, but not really perceptible
  
  → Ignoring it
Formalizing regular stress

- Final stress with simple constraints (Gordon, 2002)
- ALIGN-R: Place gridmark on rightmost syllable of PWord

<table>
<thead>
<tr>
<th></th>
<th>*ά</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>badasxan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>![gridmark] ba.das.xán</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>ba.dás.xan</td>
<td>*!</td>
</tr>
</tbody>
</table>
Formalizing regular stress

- Final stress with simple constraints (Gordon, 2002)
- ALIGN-R: Place gridmark on rightmost syllable of PWord

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</thead>
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<tr>
<td>badasxan</td>
<td>*ó</td>
<td>ALIGN-R</td>
</tr>
<tr>
<td>a.</td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td></td>
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<thead>
<tr>
<th></th>
<th>*ó</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>vakør</td>
<td>*ó</td>
<td>ALIGN-R</td>
</tr>
</tbody>
</table>
| a. |  | *
| b. |  | *
Stress shift

- Suffixation triggers stress shift to final syllable
- Final syllable can be derivational suffix
  
  \text{badasxán} \quad \text{‘answer’}
  
  \text{badasxan-avór} \quad \text{‘responsible’}
Stress shift

- Suffixation triggers stress shift to final syllable
- Final syllable can be derivational suffix
  
  \[ \text{badasxán} \quad \text{‘answer’} \]
  
  \[ \text{badasxan-a} \text{vór} \quad \text{‘responsible’} \]

- Or inflectional suffix
  
  \[ \text{badasxan-nér} \quad \text{‘answer-PL’} \]
  
  \[ \text{badasxan-ner-ú} \quad \text{‘answer-PL-GEN’} \]
Stress shift

- Suffixation triggers stress shift to final syllable
- Final syllable can be derivational suffix
  
  \[
  \begin{align*}
  \text{badasxán} & \quad \text{‘answer’} \\
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  \end{align*}
  \]

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  \end{align*}
  \]

- And even compounds too
  
  \[
  \begin{align*}
  \text{badasxan-a-tsév} & \quad \text{‘way of answering’}
  \end{align*}
  \]
**Stress shift**

- Suffixation triggers stress shift to final syllable
- Final syllable can be derivational suffix
  
  \[
  \text{badasxán} \quad \text{‘answer’}
  \]
  
  \[
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- Or inflectional suffix
  
  \[
  \text{badasxan-nér} \quad \text{‘answer-PL’}
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  \]
- And even compounds too
  
  \[
  \text{badasxan-a-ţsév} \quad \text{‘way of answering’}
  \]
- But schwa suffixes resist final stress
  
  \[
  \text{badasxán-ə} \quad \text{‘answer-DEF’}
  \]
  
  \[
  \text{badasxán-əs} \quad \text{‘answer-1POSS’}
  \]
  
  \[
  \text{badasxán-ət} \quad \text{‘answer-2POSS’}
  \]
Formalizing stress shift

- Suffixes trigger stress shift, and we can model stress shift either post-cyclically (Parallelist) or Cyclically
- If done in Parallel, then no new constraints are needed

<table>
<thead>
<tr>
<th></th>
<th>stress shift</th>
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</tr>
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<tbody>
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<td></td>
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<td></td>
</tr>
<tr>
<td>badasxan-ner</td>
<td>*ó</td>
<td>ALIGN-R</td>
</tr>
<tr>
<td>a.</td>
<td>ba.das.xan-nér</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>ba.das.xán-ner</td>
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Formalizing stress shift

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<tr>
<td>b. ba.das.xán-ner</td>
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- If stress shift is done cyclically, then may need low-ranked IDENT.

<table>
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<th></th>
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<th>ALIGN-R</th>
<th>IDENT</th>
</tr>
</thead>
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<tr>
<td>[badasxán] /-ner/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. ba.das.xan-nér</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ba.das.xán-ner</td>
<td>*!</td>
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<td></td>
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</table>
Interim summary

- Regular stress is pretty simple
- It can work with multitude of models and theories
  - Parallelism
  - Cyclicity
- We don’t need feet at all for regular stress + there’s no positive evidence either
- In fact, if a final-stress language uses just F0 rises, then it is likely footless (Özçelik, 2017)
  → irregular stress patterns carve out the ingredients that we need
Schwa Words

- So far seen data where words have at least **ONE** non-schwa
- But in words with only schwas, there’s attested variation
- For Eastern Armenian, some report initial stress, some report final
  \[ th\hat{o}r\hat{e}m\hat{p}h \] ‘type of noise’  (Vaux, 1998, 133)
  \[ ts\hat{e}ll\hat{e}k\hat{\text{͡}}\text{th}h \] ‘raindrops’  (Açarîyan, 1971, 339)
- Mostly nativized borrowings or onomatopoeia
- For final stress on schwa words, it’s a last resort because of constraint
  - Align-R
  - \[ fa\]  \[ fb\]  \[ fa\]  \[ fb\]  \[ fa\]  \[ fb\]
So far seen data where words have at least ONE non-schwa
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For Eastern Armenian, some report initial stress, some report final
\[ \text{thórəmp} \] ‘type of noise’ (Vaux, 1998, 133)
\[ \text{tsəlləkót} \] ‘raindrops’ (Açaryan, 1971, 339)
In author’s ideolect (+ Lebanon), norm is final stress
\[ \text{fəstáx} \] ‘pistachio’ from Turkish [fuştúık]
\[ \text{bəjjáx} \] ‘mustache’ from Turkish [bıyık]
Mostly nativized borrowings or onomatopoeia
Schwa words

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- Mostly nativized borrowings or onomatopoeia
- For final stress on schwa words, it’s a last resort because of constraint ranking

<table>
<thead>
<tr>
<th>fəstóx</th>
<th>*é</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. [ fəstóx ]</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. [ fástəx ]</td>
<td>*</td>
<td>*!</td>
</tr>
</tbody>
</table>
Stress shift with schwas

- Puzzles arise once we add suffixes
- Non-schwa suffixes trigger stress shift as expected

\[ \text{fəstóx} \quad \text{‘pistachio’} \]
\[ \text{fəstəx-nér} \quad \text{‘pistachio-PL’} \]
\[ \text{fəstəx-ner-óv} \quad \text{‘pistachio-PL-INST’} \]
Stress shift with schwas

- Puzzles arise once we add suffixes
- Non-schwa suffixes trigger stress shift as expected
  - \textit{f\`o\text{st}\`o\x{a}x} ‘pistachio’
  - \textit{f\`o\text{st}\`e{x}-n\`e{r}} ‘pistachio-PL’
  - \textit{f\`o\text{st}\`e{x}-ner-\text{\acute{o}v}} ‘pistachio-PL-INST’
- But schwas suffixes also block stress shift!
  - \textit{f\`o\text{st}\`o\x{a}x} ‘pistachio’
  - \textit{f\`o\text{st}\`o\x{a}x-\text{\ae}} ‘pistachio-DEF’
  - \textit{f\`o\text{st}\`o\x{a}x-\text{\ae}s} ‘pistachio-1POSS’
  - \textit{f\`o\text{st}\`o\x{a}x-\text{\ae}t} ‘pistachio-2POSS’
In all-schwa words, root schwas can take stress but suffix schwas don’t

\[ \text{fəstəx} \quad \text{‘pistachio’} \]
\[ \text{fəstəx-ə} \quad \text{‘pistachio-DEF’} \]
In all-schwa words, root schwas can take stress but suffix schwas don’t

ť말@c ‘pistachio’
ť말c-ę ‘pistachio-DEF’

For the Parallel approach, the above makes no sense with our current constraint set

<table>
<thead>
<tr>
<th>펨코x-ę</th>
<th>*</th>
<th>ALIGN-R</th>
</tr>
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<tbody>
<tr>
<td>a. 펨코x-ę</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. 펨코x-ę</td>
<td>*</td>
<td>!</td>
</tr>
<tr>
<td>c. 펨코x-ę</td>
<td>*</td>
<td>! !</td>
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How to make sense of this?
**Schwa puzzle**

- In all-schwa words, root schwas can take stress but suffix schwas don’t
  
  \[ \text{\texttt{f\text{\text{-}s}t\text{-}w\text{-}x}} \quad \text{‘pistachio’} \]
  
  \[ \text{\texttt{f\text{\text{-}s}t\text{-}w\text{-}x-\text{-}x}} \quad \text{‘pistachio-DEF’} \]

- For the **Parallel** approach, the above makes no sense with our current constraint set

<table>
<thead>
<tr>
<th></th>
<th>(\texttt{f\text{\text{-}s}t\text{-}w\text{-}x-\text{-}x})</th>
<th>(\text{*})</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>(\text{\text{-}x})\texttt{f\text{\text{-}s}t\text{-}w\text{-}x-\text{-}x})</td>
<td>(\text{*})</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>(\text{text{-}x})\texttt{f\text{\text{-}s}t\text{-}w\text{-}x-\text{-}x})</td>
<td>(\text{*})</td>
<td>(\text{!*})</td>
</tr>
<tr>
<td>c.</td>
<td>(\text{\text{-}x})\texttt{f\text{\text{-}s}t\text{-}w\text{-}x-\text{-}x})</td>
<td>(\text{*})</td>
<td>(\text{!<em>!</em>})</td>
</tr>
</tbody>
</table>

- How to make sense of this?
  - Maybe morphological positional-faithfulness effect of how stressed schwas permitted in roots, but not suffixes (appendix) (cf. Beckman, 1997)
In all-schwa words, root schwas can take stress but suffix schwas don’t

\[
\text{festóx} \quad \text{‘pistachio’}
\]
\[
\text{festóx-ə} \quad \text{‘pistachio-DEF’}
\]

For the **Parallel** approach, the above makes no sense with our current constraint set

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<thead>
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<th>*</th>
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</tr>
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<tbody>
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<td>a.</td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td>*</td>
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</tr>
<tr>
<td>c.</td>
<td>*</td>
<td><em>!</em></td>
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How to make sense of this?
- Maybe morphological positional-faithfulness effect of how stressed schwas permitted in roots, but not suffixes (appendix) (cf. Beckman, 1997)
- or... cyclicity
Cyclicity with schwas

- **Cyclic** idea: trigger stress shift as long as don’t stress a schwa
  - \( \text{f\text{est\text{e}x}} \) ‘pistachio’
  - \( \text{f\text{est\text{e}x-\text{i}}} \) ‘pistachio-GEN’
  - \( \text{f\text{est\text{e}x-\text{e}}} \) ‘pistachio-DEF’
Cyclicity with schwas

- **Cyclic** idea: trigger stress shift as long as don’t stress a schwa
  
  \[
  \text{fəst\text{-x}} \quad \text{‘pistachio’}
  \]
  
  \[
  \text{fəst\text{-x}-ɪ} \quad \text{‘pistachio-GEN’}
  \]
  
  \[
  \text{fəst\text{-x}-ə} \quad \text{‘pistachio-DEF’}
  \]

- Formalized with **IDENT-ə**: Maintain stress-faithfulness to schwas.

\[
\begin{array}{|c|c|c|c|c|}
\hline
[\text{fəst\text{-x}}] /\text{-ə}/ & \text{IDENT-ə} & *\text{́} & \text{ALIGN-R} & \text{IDENT} \\
\hline
\text{a. } \text{fəst\text{-x}-́} & *! & * & & * \\
\text{b. } \text{fəst\text{-x}-ə} & * & * & & \\
\hline
\end{array}
\]

- So it looks like cyclicity helps with explaining why schwa suffixes block stress shift from schwa roots
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Prestressing suffixes

- We showed you regular suffixes so far that trigger/block stress shift predictably based on phonology
Prestressing suffixes

- We showed you regular suffixes so far that trigger/block stress shift predictably based on phonology.
- But there are some irregular suffixes that are prestressing, e.g. ordinal -erort
  
  \[
  \underline{\text{hída}} \quad \text{‘five’}
  \]
  
  \[
  \underline{\text{hída}}\text{-erort} \quad \text{‘fifth’}
  \]
- There are other prestressing suffixes too:

<table>
<thead>
<tr>
<th>Hypocoristics</th>
<th>Adverbializers</th>
</tr>
</thead>
<tbody>
<tr>
<td>marjám ‘Mariam’</td>
<td>uráx ‘happy’</td>
</tr>
<tr>
<td>már-o ‘Mary’</td>
<td>uráx-oren ‘happily’</td>
</tr>
</tbody>
</table>

- Focus on ordinal suffixes but the analysis applies to the others.
- These prestressors behave funny with inflection.
Ordinal suffixes

- The ordinal suffix is -erort for numbers 5++. 

<table>
<thead>
<tr>
<th>Number</th>
<th>Ordinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>hínk-erort</td>
</tr>
<tr>
<td>6</td>
<td>véts-erort</td>
</tr>
<tr>
<td>7</td>
<td>jót-erort</td>
</tr>
<tr>
<td>50</td>
<td>hissún-erort</td>
</tr>
</tbody>
</table>

1‘one’ még and ‘first’ aratfín are suppletive, so ignoring them.
• The ordinal suffix is -erort for numbers 5++ \(^1\)

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<td>50</td>
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</tbody>
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• The suffix is -rort for numbers 2-4 with root reduction

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<tr>
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<th>Ordinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>jergú-jég-rort</td>
</tr>
<tr>
<td>3</td>
<td>jerék-jé-rort</td>
</tr>
<tr>
<td>4</td>
<td>tʃórs-tʃó-rort</td>
</tr>
<tr>
<td>52</td>
<td>hissun-jergú-hissun-jég-rort</td>
</tr>
</tbody>
</table>

\(^1\)‘one’ még and ‘first’ aratfín are suppletive, so ignoring them
BIFURCATION OF OPTIONS

- How do we want to derive prestressing?
- **Representation**: the prestressing suffix has underlying defective stress material
  
  Iambic foot?  \((σσ)-erort/\)
  Trochaic foot?  \((σ-e)rort/\)
  Floating grid?  \(*-erort/\)

- **Procedure**: the prestressing suffix triggers special rules/constraints
  
  Cophonology?  IDENT >> ALIGN-R
  Foot-Alignment?  ANCHOR-F >> ALIGN-R

- Answer:
Bifurcation of options

- How do we want to derive prestressing?
- **Representation:** the prestressing suffix has underlying defective stress material
  
  Iambic foot? \((\sigma\sigma\sigma\sigma)\)-erort/
  
  Trochaic foot? \((\sigma\sigma\sigma\sigma)\)-erort/
  
  Floating grid? \(*\)-erort/

- **Procedure:** the prestressing suffix triggers special rules/constraints
  
  Cophonology? IDENT >> ALIGN-R
  
  Foot-Alignment? ANCHOR-F >> ALIGN-R

- **Answer:** Need a combination!
Prestressing puzzle

- Puzzle 1: Both the full and reduced suffix are pre-stressing

\[
\begin{array}{cc}
5 & 4 \\
\underline{hǐnk} & \underline{tjórs} & \text{Number} \\
\underline{hǐnk-erort} & \underline{tjó-rort} & \text{Ordinal}
\end{array}
\]

→ Should be able to treat them equally
**Prestressing puzzle**

- **Puzzle 1:** Both the full and reduced suffix are pre-stressing
  
  \[
  \begin{align*}
  5 & \quad 4 \\
  \underline{hínk} & \quad \underline{tʃórs} & \text{Number} \\
  \underline{hínk-erort} & \quad \underline{tʃó-ort} & \text{Ordinal}
  \end{align*}
  \]

  → Should be able to treat them equally

- **Puzzle 2:** When add normal suffix, get stress shift
  
  \[
  \begin{align*}
  \underline{hínk-erort} & \quad \underline{tʃó-ort} \\
  \underline{hink-erort-nér} & \quad \underline{tʃo-ort-nér} & \text{-PL} \\
  \underline{hink-erort-óv} & \quad \underline{tʃo-ort-óv} & \text{-INST}
  \end{align*}
  \]
PRESTRESSING PUZZLE

• Puzzle 1: Both the full and reduced suffix are pre-stressing

\[
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5 & \quad 4 \\
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\text{hínk}-\text{erort} & \quad \text{tjó}-\text{rort} \quad \text{Ordinal}
\end{align*}
\]

→ Should be able to treat them equally

• Puzzle 2: When add normal suffix, get stress shift

\[
\begin{align*}
\text{hínk}-\text{erort} & \quad \text{tjó}-\text{rort} \\
\text{hink-erort-nér} & \quad \text{tjó-ort-nér} \quad \text{-PL} \\
\text{hink-erort-óv} & \quad \text{tjó-ort-óv} \quad \text{-INST}
\end{align*}
\]

• Puzzle 3: But when add schwa suffix, see stress shift to ordinal!

\[
\begin{align*}
\text{hínk}-\text{erort} & \quad \text{tjó}-\text{rort} \\
\text{hink-erórt-ə} & \quad \text{tjó-ort-ə} \quad \text{-DEF}
\end{align*}
\]

→ Regular morphology overrides irregulars, even if doesn’t take stress
• For the basic pattern:

\[
\begin{align*}
\text{hǐnk} & \quad 5 \\
\text{hǐnk}-\text{erort} & \quad 5\text{th}
\end{align*}
\]

• **Representation:** Let’s assume the suffix has a preceding iambic foot
  \(/	ext{hink}/ + /(\sigma\sigma)-\text{erort}/\)


For the basic pattern:

\[
\begin{array}{c|c}
\text{hǐnk} & 5 \\
\hline
\text{hǐnk-erort} & \text{5th}
\end{array}
\]

**Representation:** Let’s assume the suffix has a preceding iambic foot

/\text{hink}/ + /([σσ])-erort/  

**And Procedurally,** this suffix selects a cophonology where a high-ranked constraint \textsc{Anchor-F} requires that the iambic foot is realized

<table>
<thead>
<tr>
<th>\text{/hink/} + /([σσ])-erort/</th>
<th>\text{ANCHOR-F}</th>
<th>\text{ALIGN-R}</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. \text{hink-erórt}</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. \text{(hǐnk)-erort}</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
• The reduced suffix does same prestressing behavior

| Number | hínk | 4  
| Ordinal | hínk-erort | tʃó-rupt |

/hínk/+/(σσ)-erort/  
/ʃo-/+/(σσ)-rort/

• Stress is on both the full root hínk and the reduced root tʃó-
Puzzle 1: reduced suffixes

- The reduced suffix does same prestressing behavior

<table>
<thead>
<tr>
<th>Number</th>
<th>hínk</th>
<th>tʃórs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinal</td>
<td>hínk-erort</td>
<td>tʃó-ort</td>
</tr>
</tbody>
</table>

/hink/+/(σσ)-erort/ /tʃo-/+/(σσ)-ort/

- Stress is on both the full root hínk and the reduced root tʃó-

- With Parallelism, it works thanks to cophonology of ANCHOR-F >> ALIGN-R

<table>
<thead>
<tr>
<th>/tʃo-/+/(σσ)-ort/</th>
<th>ANCHOR-F</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. tʃo-rórt</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. (tʃó)-rort</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
But it’s weird for the \textbf{Cyclic} analysis

If we instead just use cyclicity, we would argue that \textit{-erort} selects a cophonology that blocks stress shift
Puzzle 1: reduced suffixes

- But it’s weird for the **Cyclic** analysis
- If we instead just use cyclicity, we would argue that *-erort* selects a cophonology that blocks stress shift
- A cyclic cophonology of **IDENT >> ALIGN-R** would look fine for **hínk-erort**...

<table>
<thead>
<tr>
<th>[hínk] + <em>/σ-s</em>/-erort/</th>
<th>IDENT</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. hink-érórt</td>
<td>⋆</td>
<td></td>
</tr>
<tr>
<td>b. hínk-erort</td>
<td>⋆</td>
<td></td>
</tr>
</tbody>
</table>
Puzzle 1: reduced suffixes

- But it’s weird for the Cyclic analysis
- If we instead just use cyclicity, we would argue that -erort selects a cophonology that blocks stress shift
- A cyclic cophonology of IDENT >> ALIGN-R would look fine for hÍnk-erort...

<table>
<thead>
<tr>
<th>[hÍnk] + /((σσ)-erort/)</th>
<th>IDENT</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. hink-erÓrt</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. hÍnk-erort</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

- But fishy for tfjó-rort because the stressed base is tfjórs not tfjó-

<table>
<thead>
<tr>
<th>/tfjó-/ + /((σσ)-rort/)</th>
<th>IDENT</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. tfjó-rÓrt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. tfjó-rort</td>
<td></td>
<td>*!</td>
</tr>
</tbody>
</table>
Puzzle 2: Stress shift

• ‘Easier’ to say that -erort selects a Anchor-F >> Align-R cophonology, with or without cyclicity

<table>
<thead>
<tr>
<th>[hínk] + /(σσ)-erort/</th>
<th>Anchor-F</th>
<th>Align-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>/hink/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. hink-errórt</td>
<td></td>
<td>*!</td>
</tr>
<tr>
<td>b. (hínk)-erort</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
Puzzle 2: Stress shift

- ‘Easier’ to say that -erort selects a ANCHOR-F >> ALIGN-R cophonology, with or without cyclicity

<table>
<thead>
<tr>
<th></th>
<th>ANCHOR-F</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>[hínk] + /(σσ)-erort/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/hink/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. hink-erórt</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. (hínk)-erort</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

- But when further inflected, we get back to regular phonology, where ANCHOR-F is inactive

\[
\begin{align*}
\text{hínk-erort} & \quad \text{tʃó-ort} \\
\text{hink-erort-ér} & \quad \text{tʃo-ort-ér} -\text{PL} \\
\text{hink-erort-óv} & \quad \text{tʃo-ort-óv} -\text{INST}
\end{align*}
\]
Puzzle 2: Stress shift

- ‘Easier’ to say that -erort selects a Anchor-F >> Align-R cophonology, with or without cyclicity

<table>
<thead>
<tr>
<th>[hínk] + /{(σσ)-erort/</th>
<th>Anchor-F</th>
<th>Align-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>/hínk/</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Anchor-F</th>
<th>Align-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>hink-erórt</td>
<td>*!</td>
</tr>
<tr>
<td>b.</td>
<td>(hínk)-erort</td>
<td>*</td>
</tr>
</tbody>
</table>

- But when further inflected, we get back to regular phonology, where Anchor-F is inactive

- The regular suffixes select the ‘regular’ lexical cophonology of final stress

<table>
<thead>
<tr>
<th>[hínk-erort] /-ner/</th>
<th>Align-R</th>
<th>Ident</th>
<th>Anchor-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hink-erort-nér</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td>!**</td>
<td></td>
</tr>
</tbody>
</table>
Puzzle 3: Schwa suffixes

- Remarkably, even a schwa suffix will trigger the ‘regular’ cophonology of final stress

\[
\begin{align*}
\text{hínk-erort} & \quad \text{tjó-ört} \\
hink-érórt-ә & \quad tjo-rórt-ә \quad \text{-DEF}
\end{align*}
\]

- Even though the stress now lands on the prestressor!
Puzzle 3: Schwa suffixes

- Remarkably, even a schwa suffix will trigger the ‘regular’ cophonology of final stress

\[
\begin{align*}
\mathbf{h\text{"imk}-erort} & \quad \mathbf{\tilde{t}f\text{"o}-rort} \\
\text{hink-erórt-\text{"e}} & \quad \tilde{t}f\text{"o-rórt-\text{"e}} \quad \text{-DEF}
\end{align*}
\]

- Even though the stress now lands on the prestressor!

→ These prestressor’s aren’t always unstressed

<table>
<thead>
<tr>
<th>[\text{hink-erort}] /-\text{&quot;e}/</th>
<th>*\text{&quot;e}</th>
<th>ALIGN-R</th>
<th>IDENT</th>
<th>ANCHOR-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. \text{hink-erort-\text{&quot;e}}</td>
<td>*!</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. \text{hink-erórt-\text{&quot;e}}</td>
<td>*</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. \text{hink-erort-\text{&quot;e}}</td>
<td>*<em>!</em></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table of Contents

- Introduction
- Regular stress
- Cyclicity: schwa words
- Cophonology: overriding irregulars
- Alternative?
- Conclusion
Can we avoid cophonologies?

- Cophonologies can get all the data, but do we really need it?
- An adequate alternative needs to account for the following:

  - `badasxán` ‘answer’ (regular stress)
  - `badasxán-ə` ‘answer-DEF’ (pre-schwa stress)

- And the prestressing:

  - `hínk-erort` ‘fifth’ (prestressing)
  - `hink-erort-nér` ‘fifth-PL’ (shift to regular suffix)
  - `hink-erórt-ə` ‘fifth-DEF’ (shift to prestressor before schwa suffix)

- Let’s try to sketch out an alternative without cycles or cophonologies. Maybe it works?
Let’s assume we got iambic feet, and that stress is non-iterative

<table>
<thead>
<tr>
<th></th>
<th>*​</th>
<th>ALL-Ft-R</th>
<th>PARSE-σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>ba(das_x_án)</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b.</td>
<td>(ba_d_á_s)xan</td>
<td>*!</td>
<td>*</td>
</tr>
<tr>
<td>c.</td>
<td>(bad_à_s)(_x_án)</td>
<td>*!</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>*​</th>
<th>ALL-Ft-R</th>
<th>PARSE-σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>badas(xan-__o)</td>
<td>*!</td>
<td>**</td>
</tr>
<tr>
<td>b.</td>
<td>ba(das_x_á)_n-__o)</td>
<td>*!</td>
<td>**</td>
</tr>
</tbody>
</table>
**Prestressing and Parse**

- What if prestressors are (violably) banned from getting parsed?

<table>
<thead>
<tr>
<th></th>
<th>*ó</th>
<th>*PARSE-erort</th>
<th>ALL-Ft-R</th>
<th>PARSE-σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. hink-(éropt)</td>
<td>*!</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. (hínk)-erort</td>
<td>**</td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

- This can explain stress shift to new suffixes

<table>
<thead>
<tr>
<th></th>
<th>*ó</th>
<th>*PARSE-erort</th>
<th>ALL-Ft-R</th>
<th>PARSE-σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. hink-erort-(nér)</td>
<td></td>
<td></td>
<td></td>
<td>** **</td>
</tr>
<tr>
<td>b. hink-(erórt)-ner</td>
<td>*!</td>
<td></td>
<td></td>
<td>* **</td>
</tr>
<tr>
<td>c. (hínk)-erort-ner</td>
<td></td>
<td></td>
<td></td>
<td>*! **</td>
</tr>
</tbody>
</table>
*But schwas*

- But this system breaks with schwas:

<table>
<thead>
<tr>
<th></th>
<th>hink-erort-ə</th>
<th>*ó</th>
<th>*PARSE-erort</th>
<th>ALL-FT-R</th>
<th>PARSE-σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>hink-eror(t-ə)</td>
<td>*!</td>
<td></td>
<td></td>
<td>* * *</td>
</tr>
<tr>
<td>b.</td>
<td>hink-(eró́r)t-ə</td>
<td></td>
<td>*!</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>c.</td>
<td>(hǐnk)-erort-ə</td>
<td></td>
<td></td>
<td>* * *</td>
<td>* * *</td>
</tr>
</tbody>
</table>
But schwas

- Patch: Maybe schwas must adjoin to a iambic foot (layered feet)

<table>
<thead>
<tr>
<th>hink-erort-ə</th>
<th>ALIGN-ə</th>
<th>*PARSE-erort</th>
<th>All-Ft-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.IRROR(hink(-erort-ə)</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. (hink)-erort-ə</td>
<td>*!</td>
<td></td>
<td>* * *</td>
</tr>
</tbody>
</table>

- Might explain why schwas in open syllables like to delete in standard speech:

<table>
<thead>
<tr>
<th>vakər-ə</th>
<th>ALIGN-ə</th>
<th>All-Ft-R</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. va(kərə)</td>
<td><em>!</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ((vá)kərə)</td>
<td>*!</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>c. ((vákə)rə)</td>
<td>*!</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>d. ((vák)rə)</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>
Takeaway

- Regular stress is final, and schwas are unstressed
- Can handle regular stress with or without feet, with cyclicity or no cyclicity, with one or more cophonologies
- But irregular stress is hard
  1. Cyclicity for stress shift
  2. A single regular cophonology for the lexical stratum
  3. Feet for irregular prestressors
  4. A special prestressing cophonology for prestressors
What’s next

- There’s a lot left from Armenian
  1. Acoustic verification
  2. Dialectal variation
     → The suffixes -\textit{rort} and -\textit{erort} behave differently in other lects
     → schwa-words are weird again!
  3. Other irregular stress affixes
     → clitics select the same lexical cophonology
     → prestressors can assign stress to schwas, or get stressed by C suffixes
  4. Combination among irregular stress affixes
- Teaser: hypocoristics and adverbalzare do funner stuff
  \underline{már-o} ‘Mary’ \underline{káxštør} ‘sweet’
  mar-ó-n ‘Mary-DEF’ \underline{káxštør-oren} ‘sweetly’
  \underline{kaxštór-oren} ‘sweetly’
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Appendix
Roadmap

- Multiple final schwas [37]
- Root-suffix distinction in stressed schwas [38]
- wh-words and irregular stress shift [40]
- Dialectal variation for stressing reduced allomorphs in ordinals [39]
- Cliticization and prestressing [41]
Schwas and Distance

- If word has both non-schwas and schwas, then stress is on the rightmost non-schwa
  
  $\text{badas}x\acute{\text{a}}\text{n-}\breve{\text{o}}$  ‘answer-DEF’
  
  $\text{badas}x\acute{\text{a}}\text{n-}\text{\-s}$  ‘answer-1POSS’
  
  $\text{badas}x\acute{\text{a}}\text{n-}\text{\-t}$  ‘answer-2POSS’

- Usually, a word ends with at most 1 schwa
  
  $\text{v\acute{a}k\vbreve{e}r}$  ‘tiger’
  
  $\text{v\acute{a}kr-}\breve{\text{o}}$  ‘tiger-DEF (standard)’

- But colloquial speech can create a final sequence of two schwas
  
  $\text{v\acute{a}k\vbreve{e}r-}\breve{\text{o}}$  ‘tiger-DEF (colloquial)’

- Derivable with previous constraints
**Schwa shifting**

- In words with non-schwas + schwas, stress the rightmost non-schwa
  
  \[ \text{vákər} \quad \text{‘tiger’} \]
  
  \[ \text{vákər-ə} \quad \text{‘tiger-DEF (nonstandard)’} \]

- In words with only schwas, the rightmost root-schwa gets stress
  
  \[ \text{fəstóx} \quad \text{‘pistachio’} \]
  
  \[ \text{fəstóx-ə} \quad \text{‘pistachio-DEF’} \]

- If want to do things all in parallel, then distinguish stressed root-schwas vs. stressed suffix-schwas

<table>
<thead>
<tr>
<th>fəstóx-ə</th>
<th>*(\varepsilon_{\text{suffix}})</th>
<th>*(\varepsilon_{\text{root}})</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>fəstóx-ə</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>b. *</td>
<td>fəstóx-ə</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>
Reduced Ordinals

- The ordinal suffix -erort for most numbers, and -rort for 2-4
- The reduced suffix -rort occurs with bound versions of numbers
  
  \[
  \begin{array}{c c}
  5 & 4 \\
  \hline
  \text{hínk} & \tilde{\text{tjórs}} \\
  \text{hínk-erort} & \tilde{\text{tjó}}-\text{rort}
  \end{array}
  \]

- Ideolectal variation for how these ordinal allomorphs behave in stress

<table>
<thead>
<tr>
<th>Prestress?</th>
<th>Western</th>
<th>Eastern</th>
</tr>
</thead>
<tbody>
<tr>
<td>-erort?</td>
<td>✓✓</td>
<td>✓✓/✗✗</td>
</tr>
<tr>
<td>-rort?</td>
<td>✓✓</td>
<td>✓✓/✗✗</td>
</tr>
</tbody>
</table>

- Most report that final stress is winning out in Eastern Armenian
  → Variation is due to loss of defective underlying feet in or both allomorphs
  → If reduced form -rort is irregular, then the unreduced form -erort is too
  → If unreduced form -erort is regular, then the reduced form -rort is too
• wh-words can be inflected and get final stress
  \( \text{\texttt{\textipa{int\j\j}}} \) ‘what’
  \( \text{\texttt{\textipa{int\j\j-\textipa{\ov}}} \) ‘what-INST (with what?)’
• But ‘derived’ wh-words keep stress on the wh-morpheme, whether with prestressing affix or not
  \( \text{\texttt{\textipa{int\j\j}-jan}} \) ‘what-FAMILY (what family?)’
  \( \text{\texttt{\textipa{int\j\j}-erort}} \) ‘what-ORD (which from indexed set?)’
• Further inflection/cliticization doesn’t shift primary stress, though perhaps got final secondary stress
  \( \text{\texttt{\textipa{int\j\j}-jan-ov}} \) ‘what-FAMILY-INST (with what family?)’
  \( \text{\texttt{\textipa{int\j\j}-erort-ov}} \) ‘what-ORD-INST (with which from indexed set?)’
• Simple boring story: wh-ness of the wh-morpheme and its inflected forms are indexed to be stressed
• Other inflectable/derivable wh-words are \( \text{\textipa{vór}} \) ‘which’ and \( \text{\textipa{kaní}} \) ‘how many’
Clitic

- Clitics block stress shift but trigger resyllabification
  
  \[ \text{badas} \underline{xá.n}=e \quad \text{‘answer=is’} \]
  
  \[ \underline{vá}kə.r=e \quad \text{‘tiger=is (colloquial)’} \]

- Treat them as outside MWord and PWord

- Clitic is either recursively parsed or part of Composite Group (Vogel, 2016)
Clitic clusters

- Clitic clusters are all ignored by stress
  - `badasxán` ‘answer’
  - `badasxán=e` ‘answer=is’
  - `badasxán=al` ‘answer=also’
  - `badasxán=al=e` ‘answer=also=is’
  - `badasxán=mən=al=ə` ‘answer=INDF=also=is’

- Even for schwa-final words
  - `vákɔr` ‘tiger’
  - `vákɔr=e` ‘tiger=is’
  - `vákɔr=al` ‘tiger=also’
  - `vákɔr=al=e` ‘tiger=also=is’
  - `vákɔr=mən=al=ə` ‘tiger=INDF=also=is’
Formalizing clitics

- Clitics show that stress remains in lower PWord
- Assume ALIGN-R is defined for just lower PWord
- Can block stress shift with parallelism or strata
- **Parallelism**: Stress stays in minor PWord via constraint
- **DontStressClitic**

<table>
<thead>
<tr>
<th>basxan=e</th>
<th>Don'tStressClitic</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ba.das.xa.n=é</td>
<td>*!</td>
<td>*</td>
</tr>
<tr>
<td>b. ⚫ ba.das.xá.n=e</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. ba.dás.xa.n=e</td>
<td></td>
<td>*!</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>vakør=e</th>
<th>Don'tStressClitic</th>
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<tbody>
<tr>
<td>a. va.kø.r=é</td>
<td>*!</td>
<td>*</td>
</tr>
<tr>
<td>b. va.kó.r=e</td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>c. ⚫ vá.kø.r=e</td>
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<td>*</td>
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</table>
**Formalizing clitics**

- **Cyclically**: Lexical strata allows stress shift, while post-lexical strata don’t
- Promotion of IDENT for stress in post-lexical stratum

<table>
<thead>
<tr>
<th></th>
<th>IDENT</th>
<th>* ó</th>
<th>ALIGN-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>[badasxán] / [=e/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. ba.das.xa.n=é</td>
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<td></td>
</tr>
<tr>
<td>c. ba.dáš.xa.n=e</td>
<td>*!</td>
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<tr>
<td>[vákər] / [=e/</td>
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<td>c. vá.kə.r=e</td>
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</table>
**Clitic with schwas**

- Puzzles arise once we add suffixes and enclitics
- Non-schwa suffixes trigger stress shift as expected
  
  \[
  \text{fəstùx} \quad \text{‘pistachio’} \\
  \text{fəstùx-ñér} \quad \text{‘pistachio-PL’} \\
  \text{fəstùx-ner-óv} \quad \text{‘pistachio-PL-INST’}
  \]

- Clitics block stress shift, as expected
  
  \[
  \text{fəstùx}=\text{al} \quad \text{‘pistachio}=\text{also’} \\
  \text{fəstùx}=\text{al}=\text{e} \quad \text{‘pistachio}=\text{also}=\text{is’}
  \]

- But schwas suffixes also block stress shift!
  
  \[
  \text{fəstùx-ə} \quad \text{‘pistachio-DEF’} \\
  \text{fəstùx-əs} \quad \text{‘pistachio-1POSS’} \\
  \text{fəstùx-ət} \quad \text{‘pistachio-2POSS’}
  \]
**Prestressing + clitic**

- **Puzzle 1:** Both the full and reduced suffix are pre-stressing

\[
\begin{align*}
\text{Number} & \quad \text{hínk} & \quad \text{tjór}rs \\
\text{Ordinal} & \quad \text{hínk-erort} & \quad \text{tjó-rort}
\end{align*}
\]

→ Should be able to treat them equally

- **Puzzle 2:** When add normal suffix, get stress shift

\[
\begin{align*}
\text{-PL} & \quad \text{hink-erort-nér} & \quad \text{tjó-rort-nér} \\
\text{-INST} & \quad \text{hink-erort-óv} & \quad \text{tjó-rort-óv}
\end{align*}
\]

- **Puzzle 3:** But when add schwa suffix, see stress shift to ordinal!

\[
\begin{align*}
\text{-DEF} & \quad \text{hink-erórt-ə} & \quad \text{tjó-rórt-ə}
\end{align*}
\]

- **Puzzle 4:** When add a clitic, also see stress on ordinal

\[
\begin{align*}
\text{=is} & \quad \text{hink-erórt}=e & \quad \text{tjó-rórt}=e
\end{align*}
\]

→ Regular morphology overrides irregulars, even if doesn’t take stress
Puzzle 4: Clitics

- For normal words, clitics are unstressed and don’t do anything special

  ‘answer’  ‘tiger’
  badas\underline{xán}  \underline{vákər}
  ‘-ABL’  badasxan-\textbar{é}  vakər-\textbar{é}
  ‘=is’  badas\underline{xán}=e  \underline{vákər}=e

- For pre-stressing suffixes, clitics trigger regular stress

  ‘5th’  ‘4th’
  hink-erort  ts\j{ò}-rort
  ‘-ABL’  hink-erort-\textbar{é}  ts\j{ò}-rort-\textbar{é}
  ‘=is’  hink-e\underline{rót}=e  ts\j{ò}-\underline{rót}=e

- Paradox: clitics are post-lexical but create normal lexical stress
The paradox makes no sense if we use stratal reranking.

For normal words, we could use reranking of IDENT in lexical vs. post-lexical strata.

<table>
<thead>
<tr>
<th>[badasxán] /-e/</th>
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<tbody>
<tr>
<td>a. 商品</td>
<td>badasxan-é</td>
<td>*</td>
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Paradox and strata

- For prestressed words, the lexical stratum of -e would correctly trigger regular stress

<table>
<thead>
<tr>
<th>[hínk-erort] /-e/</th>
<th>ALIGN-R</th>
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<th>ANCHOR-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. hink-erort-é</td>
<td>✗</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>b. hink-érórt-e</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>c. hínk-erort-e</td>
<td>✗</td>
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- But the post-lexical reranking would incorrectly stress shift

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- Post-lexical reranking is not enough!
• The difference between lexical and post-lexical stratum thus cannot involve reranking

• Generalization: stress stays inside PWord and clitics trigger regular stress

→ **DONTSTRESSCLITIC**: stress stays inside (lower) PWord

• For regular words, the lexical and post-lexical strata are the same.

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<tr>
<td>a. (\text{\textasciitilde}) badasxan-é</td>
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• But **DONTSTRESSCLITIC** shows its effects only in post-lexical stratum

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For prestressed words, this identical ranking will generate regular stress before inflection:

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<td>b. hínk-erort-e</td>
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And in cliticization:

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References


